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PATENT

SIMTEK5694

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Appellants: Shiro Adacda
Tatsuya Anma
Hideaki Takahashi

App. No.: 09/778338

Filed: February 7, 2001


Title: MULTIPOLAR MAGNET TYPE GENERATOR
FOR INTERNAL COMBUSTION ENGINES

Art Unit: 2834

Conf. No: 1468

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September 7, 2004



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SUBSTITUTE APPEAL BRIEF

Commissioner for Patents
Alexandria, VA 22313

Sir:

RELATED APPEALS AND INTERFERENCES

There is a related co-pending and commonly assigned case on appeal, Serial No. 09/742751, in which an Oral Hearing was requested on July 12, 2004. The claims in that case contain limitations presented in dependent Claims 7 and 9 through 11 in this case. The rejection of these features is on different reference of the same inventor as applied in this case. It is believed that these appeals should be heard together and both references are discussed in this brief and the brief filed in the other case.

Aside from that, there are no other appeals or interferences which would have a bearing on or which would be affected by the outcome of this appeal.

REAL PARTY IN INTEREST

In addition to the Appellants, the real part in interest is their assignee, Kabushiki Kaisha MORIC.

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STATUS OF AMENDMENTS

This case was on Appeal and an original Brief was filed on December 2, 2002 along with a proposed amendment. Although the Examiner has not specifically indicated that that amendment has been entered, it is assumed that it has been since the Examiner has not repeated the technical objection previously applied against the claims so amended.

The Examiner issued an Examiner's Answer on March 12, 2003 in which he relied upon and first cited new art. Because of this appellants sought either withdrawal of this newly cited art or reopening of prosecution on March 26, 2003. After several renewed requests and status letters and after nearly 17 months, the prosecution has been reopened and this art has again been mentioned in the rejection, but has not been specifically applied in the rejection. It will be discussed in this Brief. However appellants have chosen to proceed with the appeal without amendment. Hence, the claims on appeal those rejected.

STATEMENTS OF CLAIMS

Claims 1 through 7 and 9 through 11 remain in this case and are before the Board on appeal. A clean copy of these claims forms the appendix to this brief.

APPELLANTS' INVENTION

Appellants' invention relates to a rotating electrical machine and particularly an electrical generator having core teeth around which windings are formed that cooperate with a plurality of permanent magnets of alternating polarity. The core and its teeth are formed from laminations having a thickness and configuration which has been determined to provide optimum results. In addition, the permanent magnets are magnetized and have a spacing so as to provide a magnet electrical angle which, as noted in the co-pending appeal in Serial No. 09/742751, has been found to provide optimum results.

The structure of the preferred embodiment is described in full detail in the specification by reference to the figures of the drawings in the section appearing under the appropriate heading on page 4 of the specification and concluding on page 11.

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GROUPING OF THE CLAIMS

The only two claim groups that stand or fall together are Claims 3 and 4 and Claims 9 and 10. The patentability of all other claims and these two claim groupings will be argued separately.

ISSUES BEFORE THE BOARD

It is not sure whether the Board will consider the drawing objections made the Examiner but that matter will be discussed in this brief.

In addition to this, before the Board is whether the subject matter of Claims 1, 3, 4 and 6 are obvious on the combination of Uchiyama 5767601 in view of Newmann 4469970 under 35 U.S.C. 103(a).

Also before the Board is the question as to whether the use of the interlocking relationship set forth in Claims 2 is obvious on the Uchiyama, Newmann combination in further view of Yamamoto 5338996.

The Board must also determine if the subject matter of Claim 5 is obvious on the Uchiyama, Newmann, and Yamamoto combination in further view in Nose 6211595.

Further before the Board is whether the combination of Claims 7, 9 and 10 is obvious in view of the combination of Uchiyama and Newmann as applied against Claim 1 in further view of Miyao. The Miyao patent number is not specified in the most recent Office Action that is now under appeal but the only Miyao reference cited by the Examiner in this case is patent 4737674.

Also Appellant is placing before the Board the question of whether Miyao 4739203, relied on by an Examiner in related Serial Number 09/742751 is more relevant and overcomes the defects of Miyao 4737674, cited by the Examiner in this case.

There is also at issue the rejection of Claims 7 and 9 through 11 under 35 U.S.C. 112.

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APPELLANTS' ARGUMENTS

As noted above, it is not known by Appellants' attorney whether the Board will consider the drawing objection raised by the Examiner in the first Office Action and to which Appellants' attorney submitted a proposed drawing correction which the Examiner has ignored in repeating this objection in the Final Rejection. The objection deals with the showing of a certain angle called out in the claims, which angle as noted in the related appeal, is a calculated angle based upon the number of magnets that are employed and their spacing and which results in a degree of angular rotation which is not exactly a mechanical angle, but is an angle that is dependent upon the geometry of the machine and the numbers of coils and permanent magnets employed. A proposed drawing sketch was submitted to the Examiner which the Examiner has now for the first time accepted, but still argues that it does not illustrate the claimed feature. It is believed that this feature can not be properly displayed and thus should not be illustrated. If however illustration is deemed by the Board necessary, it is submitted that the proposal accepted by the Examiner serves that purpose.

Turning now to the art rejection, Claim1, the only independent claim in this application, has been rejected under 35 U.S.C. 103(a) on the combination of Uchiyama in view of Newmann. This claim is directed toward a dimensional relationship which Appellants have found is critical to obtaining optimum performance in the coil windings which are wound around laminated electromagnetic steel plates.

The thickness specified in Claim 1 is one which has been found and is demonstrated by the accompanying data to provide maximum efficiency of the machine. The Examiner has based his rejection upon the Uchiyama reference, which shows a similar machine but does not disclose the lamination thicknesses of the core. The Examiner relies upon the secondary teaching of Newmann for alleged teaching of the desired core thickness.

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However and has been argued to the Examiner, the laminations in the Newmann reference are the laminations of the magnetic material that is associated with the permanent magnets and not around which the coil windings are formed. Therefore, it is most respectfully submitted that the Examiner is combining these references based upon Appellants' teaching and not upon the teaching of the prior art. Although the Examiner argues that the art recognizes that laminations can be used for permanent magnets or cores around which coils are wound and appellants do not disagree, the art does not indicate that the optimal lamination thickness for one application would be the same as for the other application. Absent such a disclosure or teaching the position of equivalence on this specific application can not be assumed.

The prior art teaches the idea of utilizing the laminations to minimize interpolarity flux leakage between the permanent magnets and has nothing to do with the obtaining of optimum electrical efficiency in coil windings that surround laminations since there are no surrounding coil windings in Newmann. Therefore, it is most respectfully submitted that this combination is based upon Appellants' disclosure and not the teaching of the prior art.

Claims 3 and 4 stand together, as noted, and depend upon Claim 1. These claims respectively bring in the fact that the machine is a generator and, in Claim 4, recite that the permanent magnets rotate and the coil windings are fixed. This relationship is true in Uchiyama but it is pointed out that the Newmann reference deals with an electric motor that provides different characteristics than the electrical generator of Uchiyama.

The laminations are used in the connection with the permanent magnets in Newmann in order to provide a starter cage which is unique to electric motors and not electric generators. Therefore, it is believed that the Examiner's combination is based upon an attempt to construct the invention from bits and pieces of the prior art rather than combining the teachings as is required to be obvious to one skilled in the art.

As noted above, Claims 3 and 4 stands together but do not stand or fall with Claim 1.

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Claim 6 depends upon Claim 4 and calls for an insulating layer to be fixed on one surface of each of the electromagnetic steel plates. Although the Examiner states that insulators are normally utilized, he has not substantiated that this is case where the laminations are employed in connection with the magnet as is opposed to the coil windings. Therefore, it is not at all true that there would be insulations employed in the laminations of the Newmann reference as the Examiner contends. In fact, it is believed that that might interfere with the flux characteristics desired in the magnets and thus, one skilled in the art would not make such a change.

Again the Examiner makes an unsupported allegation based on an incorrect definition of the term "laminated". He implies that since driver's licenses which are laminations of paper and plastic implies that laminated cores consisting of a plurality of metal plates must inherently have separating insulators between them. Not so.

Claim 5 depends upon Claim 4 and brings in the fact that the electromagnetic plates are interlocked by the partially punched openings forming interfitting holes and projections. The Examiner has cited certain secondary references that admittedly teach this feature. However, it is submitted that one would not use this feature in the Newmann reference because Newmann employs the conductors 16 so as to maintain the laminations in position and also it should be noted that many of the laminations are connected to each other and thus, it is submitted that the combination which the Examiner is proposing is not one which would be made by one skilled in the art because it would be redundant at best.

Claim 6 depends upon Claim 5 and brings in again the insulating layer discussed above. However, since this claim depends upon a different claim, it does not stand or fall with those other claims although the patentability feature is present.

Claims 7 through 11 depend upon Claim 1 and bring in the electrical magnet angle, the feature which is argued as patentable in the co-pending appeal over Miyao 4739203 and the argument as to patentability over this reference will be repeated later in this brief.

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However, the Examiner has relied upon a different reference to the same patentee in rejecting the claims here this being Patent Number 4737674. This reference (Patent Number 4737674) does not show the use of magnets that all have the same circumferential extent nor does it disclose the arrangement where there is nonmagnetic spacing between adjacent magnet poles. Hence, the reference does not teach the features which are believed to be patentable, i.e., the claimed magnet angle. Also the specific and different circumferential extent of the magnets is employed to have the motor in this reference be self starting. This is not a requirement of or a feature that would be required of even desirable in a generator as specifically claimed.

The importance of the claimed magnet angle is that it greatly improves the efficiency of the machine and the specification of the copending application includes data indicating the improved efficiency. This feature of the invention relates to the provision of a rotating electrical machine wherein there are pluralities of circumferentially spaced permanent magnets of equal circumferential length. Rather than having the magnets disposed with no air gap between them, the magnets are disposed so that they subtend a relatively small arc related to the time in which a single wave of electrical current passes through the associated coil. This is done so as to improve the efficiency.

The Miyao reference, the principal reference relied upon by the Examiner, not only does not have equally spaced permanent magnets of opposite polarities in that he uses magnetic poles of different lengths and furthermore fails to provide any air gaps between the magnets. Furthermore, this reference is directed primarily toward providing an electric machine that will be self starting and avoid other starting assist devices allegedly shown in the prior art. Thus, the reference deals with a completely different problem and provides a completely different structure than that called out in the claims and specifically in independent Claim 1.

Although the Examiner contends that this shows an electrical angle of 120° , it shows a nature physical angle of 120° , not the 120° to 140° range set out specifically in the claims as to the relationship during the time when a complete cycle of current flows through the coil. Hence, the reference clearly had no relevance to the claimed subject matter.

The Miyao reference 4739203 cited in the copending application has exactly the same defects and the same arguments as to patentability of these claims applies also to it.

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Claims 9 and 10 stand or fall with Claim 7 in the same manner that Claims 3 and 4 depend upon Claim 1 but again because of the different dependency, these claim groupings do not stand or fall together. The argument stated above as to the patentability of this feature is incorporated by reference.

Claim 11 depends upon Claim 10 and brings in the interfitting relationship argued in connection with Claim 5. Again, it is submitted that this feature is patentable but that this claim does not stand or fall with the other ones because of its different dependency.

This now brings Appellants to the issue of the technical rejection of Claims 7 and 9 through 11 under 35 U.S.C. 112. It seems unfortunate that the Board has to consider such a matter as a technical rejection in that the Examiner and Appellants should have been able to work this out. However, it is believed that the Examiner's rejections are clearly deficient on their face. The Examiner says that the recitations "the spacing of the poles of the permanent magnet in line 1 of Claim 7 has no antecedent basis." However, Claim 1 upon which this claims depends, calls for a plurality of permanent magnets that are spaced at equal intervals. Thus, the claim clearly calls for more than one magnet and thus, the number is specified as a plurality. The Examiner also challenges the recitation of the number and spacing of the poles. However, the claim calls for a plurality of armatures around which coil windings are formed and thus, again implicitly requires a plurality of spaced poles, otherwise there could be no windings formed around them. Since the magnets clearly have a finite length, their circumferential extent is clearly obvious from the claim language particularly when calling out the specific way in which the angle is measured as set forth in the claims as the magnet electrical angle being related to the degree of rotation which each coil experiences a complete cycle of electrical current. Therefore, it is believed that this rejection should be reversed.

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In view of the foregoing, it is most respectfully submitted that the Examiner's art and technical rejections should be reversed and such action is most courteously solicited.

Respectfully submitted,



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**APPENDIX
CLEAN COPY OF CLAIMS ON APPEAL**

1. A rotating machine having a plurality of permanent magnets having alternating polarities in a circumferential direction at equally spaced intervals and a relatively rotatable associated element having a plurality of armatures around which coil windings are formed, the armatures are formed from a lamination of a plurality of electromagnetic steel plates each having a thickness in the range of 0.25-0.65mm.
2. A rotating machine as set forth in claim 1 wherein the electromagnetic steel plates are interlocked relative to each other by series of partially punched openings forming holes and projections, which inter-fit with each other so as to line up the electromagnetic steel plates in relationship to each other and to provide a mechanical coupling there between.
3. A rotating machine as set forth in claim 1 wherein the machine comprises an electrical generator.
4. A rotating machine as set forth in claim 3 wherein the permanent magnets rotate and the coil windings are fixed against rotation.
5. A rotating machine as set forth in claim 4 wherein the electromagnetic steel plates are interlocked relative to each other by series of partially punched openings forming holes and projections, which inter-fit with each other so as to line up the electromagnetic steel plates in relationship to each other and to provide a mechanical coupling there between, said partially punched openings being provided in each tooth of the stator core.
6. A rotating machine as set forth in claim 4 wherein an insulating layer is fixed to at least one surface of each of the electromagnetic steel plates.
7. A rotating machine as set forth in claim 1 wherein the spacing of the poles of said permanent magnets and their number and the number and spacing of the coils being set so that if the degree of rotation during which each coil experiences a complete cycle of electrical current is taken as 360° the circumferential extent of each of the magnet poles (the magnet electrical angle) lies in the range of 120° to 140° of such relative rotation.
9. A rotating machine as set forth in claim 7 wherein the machine comprises an electrical generator.
10. A rotating machine as set forth in claim 9 wherein the permanent magnets rotate and the coil windings are fixed against rotation.

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11. A rotating machine as set forth in claim 10 wherein the electromagnetic steel plate are interlocked relative to each other by series of partially punched openings forming holes and projections, which inter-fit with each other so as to line up the electromagnetic steel plates in relationship to each other and to provide a mechanical coupling there between.